REMARKS

Claims 1-10 are pending in this application. Claims 1 and 4 have been amended by this response. Claim 2 has been cancelled. No new matter has been added by these amendments.

Applicant wishes to thank the Examiner and his Supervisor for the courtesy extended in the telephone interview held on Wednesday, November 4, 2009. In this interview, the objection to the specification, objection to the drawings, objection to claims 1 and 4, rejection of claim 2 under 35 U.S.C. 112, and rejection of claims 1-10 under 35 U.S.C. 101 were discussed.

An agreement was reached regarding amending the specification to overcome the objection in the Office Action. Specifically, paragraph 14 of the specification was amended to recite "random drawing of p candidates from the set of key images, p being calculated to increase the probability of drawing a key image of a prevalent shot." The specification was also amended to correct typographical errors and conform all variables throughout the specification in accordance with the comments in the Office Action and the discussion during the above mentioned interview.

An agreement was also reached regarding amendments to the drawings to overcome the objection in the Office Action. Specifically, it was agreed that Fig. 3 should be replaced by a draftsperson's rendition of the result of the clustering algorithm described by the present arrangement. Originally filed Fig. 3 was a screenshot that became degraded after receipt and scanning by the USPTO. The specification is also amended to conform with the revised drawing figures. An agreement was also reached regarding accepting the Examiner's suggestion for amending box 11 of Fig. 2.

Further agreements were reached regarding amendments to overcome the objection to claims 1 and 4, and the rejection of claim 2 under 35 U.S.C. 112. Specifically, claims 1 and 4 were amended in accordance with the comments in the Office Action and in view of the discussion during the interview and claim 2 was cancelled. Concerning the rejection of

claims 1-10 under 35 U.S.C. 101, claim 1 was amended in view of the discussion during the interview. The Examiner indicated that these claim amendments appear to overcome the rejection under 35 U.S.C. 101. Specific details regarding the telephone interview are set forth below in the corresponding response sections.

Objection to the Specification

The specification is objected to for certain informalities. Specifically paragraph 14 is objected to because the phrase "very good probability" is indefinite. Paragraph 14 has been amended to recite "p being calculated to increase the probability of drawing a key image of a prevalent shot." During the above mentioned telephone interview, it was agreed that the amended language satisfies this objection. Thus, it is respectfully requested that this objection be withdrawn.

Paragraph 43 is also objected to because there is an inconsistency in the citing of Ik and I_k. Paragraph 43 has been amended to correct a typographical error and properly recite "Ik." It was also agreed that this amendment satisfies this objection. Thus, it is respectfully requested that this objection be withdrawn.

Objection to the Drawings

The drawings are objected to because the photographs are not of sufficient quality so that all details in the photographs are reproducible in the printed patent. Specifically, Figure 3 is objected to because the photographs are not acceptable to be examined. Various options for amending or replacing Figure 3 were discussed during the telephone interview. Specifically, it was proposed to replace the screen shot of Figure 3 with a draftsperson's rendition of the screenshot and the images within the screenshot. The Examiner agreed that replacing Figure 3 as discussed above should overcome the objection to the drawings. The specification was amended accordingly to identify that Figure 3 is now a draftsperson's rendition of the screenshot.

Furthermore, Figure 2 is objected to because the text corresponding to item 11 is not intelligible. In accordance with the Examiner's suggestion in the Office Action and as agreed

to in the telephone interview, the term "d(i,k) T for c" as originally shown in item 11, has been replaced with "d(i,k1) < T for i ∈Ik." Thus, it is respectfully submitted that the objection to Figure 2 is satisfied and should be withdrawn.

Objection to Claims 1 and 4

Claim 1 is objected to as being indefinite. Specifically, claim 1 is objected to for reciting the phrase "very good probability." Claim 1 has been amended similarly to the specification to recite "p being calculated to increase the probability of drawing a key image of a prevalent shot." Support for this amendment is provided throughout the specification and specifically in paragraph 13 of the specification. During the telephone interview, it was agreed that the amended language is definite and does not present new matter. Thus, it is respectfully submitted that the objection to claim 1 is satisfied and should be withdrawn.

Claim 4 is objected to because the last sentence is incomplete and ends with a comma. Claim 4 has been amended to replace the comma with a period. Thus, it is respectfully submitted that the objection to claim 4 is satisfied and should be withdrawn.

Rejection of Claim 2 under 35 U.S.C. 112

Claim 2 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

Claim 2 has been cancelled by this response rendering this rejection moot.

Rejection of Claims 1-10 under 35 U.S.C. 101

Claims 1-10 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Specifically, the claims are rejected because the claims are not tied to a particular machine or apparatus and none of the recited steps transform a particular article into a different state or thing.

Claim 1 has been amended for purposes of clarity to recite "Method of selecting seeds from a set of key images of a video sequence for the grouping of key images of prevalent

shots of the video sequence for use in interactive navigation of the video sequence ... random drawing of p candidates from the set of key images by automatically extracting shots of interest ... in order to refine the grouping of key images for the interactive navigation of the video sequence."

The Court of Appeals for Federal Circuit's recent In re Bilski decision stated that "The Supreme Court ... has enunciated a definitive test to determine whether a process claimed is tailored narrowly enough to encompass only a particular application of a fundamental principle rather than to pre-empt the principle itself. A claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus or (2) it transforms a particular article into a different state or thing" (In re Bilski, 545 F.3d 943 (Fed. Cir. 2008)).

Claim 1 describes "random drawing of p candidates from the set of key images" which is performed "by automatically extracting shots of interest." During the telephone interview, it was agreed that "automatically extracting shots of interest" tied the method to a machine or apparatus. Furthermore, only a machine is capable of the claimed feature of "automatically extracting shots of interest." The aforementioned extraction of shots cannot be automatically performed manually or by a human. Therefore, it is respectfully submitted that claim 1 recites a process tied to a machine or apparatus as defined in Bilski.

Claim 1 also describes a method for transforming data, which processes a "grouping of key images" and refines "the grouping of key images to those of interest for the interactive navigation of the video sequence." The claim further includes "deletion of the key images of the subset." Such actions constitute a transformation of data as defined in Bilski. This transformation of data is discussed in the specification, which recites that "the set of candidate images is ... restricted by discarding the elements of the subset Ik ... The elements of the new set ... are grouped together ... and utilized for a new iteration" (paragraph 45). As a result, the key images are guaranteed to be restricted to the most "compact group." Thus, it is ensured that the "first seed sought corresponds to a representative of the "interest" class" (paragraph 46). Consequently, claim 1 represents a transformation of a grouping of key

images into a refined grouping of key images by iteratively deleting key images within subsets in order to reach a resultant grouping of key images that is ideal for use in navigation of the video sequence. Furthermore, claim 1 has been amended to recite that the method is "for use in interactive navigation of the video sequence" and that "deletion of the key images" is for the purpose of refining "the grouping of key images to those of interest for the interactive navigation of the video sequence." Therefore, it is respectfully submitted that claim 1 recites a transformation of data as defined in Bilski. Thus, the rejection of claim 1 is satisfied and should be withdrawn.

Claim 2 has been cancelled rendering this rejection moot.

Claims 3-10 are dependent on claim 1 and are considered patentable for the reasons set forth above regarding claim 1. Therefore, it is respectfully submitted that the rejection of claims 3-10 are satisfied and should be withdrawn.

Rejection of Claim 1 under 35 U.S.C. 103(a)

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bradley et al. ("Refining Initial Points for K-Means Clustering," Microsoft Research Technical Report, May 1998, pages 3-4) in view of Paul E. Green ("Analyzing Multivariate Data," The Dryden Press, 1978, pages 427-428) and Jain et al. ("Algorithms for Clustering Data," Prentice Hall, 1988, pages 96-101), hereafter referenced as Bradley, Green and Jain, respectively.

"The failure of an asserted combination to teach or suggest each and every feature of a claim remains fatal to an obviousness rejection under 35 U.S.C. § 103. Section 2143.03 of the MPEP requires the "consideration" of every claim feature in an obviousness determination. To render a claim unpatentable, however, the Office must do more than merely "consider" each and every feature for this claim. Instead, the asserted combination of the patents must also teach or suggest *each and every claim feature*. *See In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (emphasis added) (to establish *prima facie* obviousness of a claimed invention, all the claim features must be taught or suggested by the prior art). Indeed, as the Board of Patent Appeal and Interferences has recently confirmed, a

proper obviousness determination requires that an Examiner make "a searching comparison of the claimed invention - *including all its limitations* - with the teaching of the prior art." *See In re Wada and Murphy*, Appeal 2007-3733, *citing In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995) (emphasis in original). "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious" (MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988))."

The present claimed arrangement provides a method of selecting seeds from a set of key images of a video sequence for the grouping of key images of prevalent shots of the video sequence for use in interactive navigation of the video sequence. A number of p candidates are randomly drawn from the set of key images by automatically extracting shots of interest. The p candidates are calculated to increase the probability of drawing a key image of a prevalent shot. The cost C for each candidate is calculated, dependent on the distance from the key images of the set to that of the candidate, the distance relating to the signatures. The candidate minimizing the cost of C is selected. A subset from among the set of key images is determined such that the key images forming the subset have a distance from the candidate less than a threshold T. A seed from among the key images of the subset is determined such that it minimizes the cost function C for this subset. The key images of the subset are deleted to form a new set of key images for at least one new random draw and determination of a new seed according to the aforementioned steps in order to refine the grouping of key images to those of interest for the interactive navigation of the video sequence.

Bradley describes approaches to clustering using an iterative procedure which converges to one of numerous local minima. Computing a refined starting condition from a given initial one that is based on an efficient technique for estimating the modes of a distribution is discussed. (See pages 3-4)

The Office Action concedes that Bradley neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" as recited in claim 1 of the present

arrangement. However, the Office Action asserts that Green describes "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" as recited in claim 1 of the present arrangement. Applicants respectfully disagree.

Green describes clustering algorithms for clustering profiles. Dimensionalizing the proximity matrix, non-heirarchical methods, and heirarchical methods of clustering are discussed. (See pages 427-428)

However, Green, like Bradley, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" as recited in claim 1 of the present arrangement. Green describes a cluster center that is selected with neighboring objects being grouped. Specifically, "a cluster center is selected and all objects within a prespecified threshold value are grouped. Then a new cluster center is selected and the process is repeated for the unclustered points." (See page 428) Green describes that iterations eliminating the objects of the previous cluster are necessary to calculate a new cluster. However, Green does not specify the manner in which the cluster centers are selected. Green does not disclose or suggest determining a seed from among the objects of the subset. In contrast, the present claimed arrangement provides for a "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T." Selecting a specific subset in order to facilitate selecting seeds from images as ion the present claimed arrangement facilitates optimal partitioning of a processed video sequence. Thus, Green, like Bradley, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" as recited in claim 1 of the present arrangement.

The Office Action further concedes that Bradley and Green, taken alone or in combination with one another, neither teaches nor suggests "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset"

as recited in claim 1 of the present arrangement. However, the Office Action asserts that Jain describes the aforementioned feature. Applicants respectfully disagree.

Jain describes an algorithm for iterative partitional clustering. An initial partition with K clusters is selected. A new partition is generated by assigning each pattern to its closest cluster center. Centroids of the clusters are computed as the new cluster centers. Generating partitions and computing new cluster centers is repeated until an optimum value of the criterion function is found. The number of clusters is adjusted by merging and splitting existing clusters or by removing small clusters. (See pages 96-97)

However, Jain neither teaches nor suggests "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement. Jain proposes an initial partition for the clustering of patterns. Obtaining the initial partition of seeds consists of choosing the K first patterns or drawing K patterns (page 97). One solution is to draw the seeds and the other solution is to calculate the centroid of the data as a first seed and to select a following seed which is at a distance from the already selected previous seeds. Thus, a set of K seeds is obtained, which provides an initial partition by assigning each pattern to the nearest seed. In contrast, the present claimed arrangement provides for selecting a following seed after eliminating subsets relating to the previously selected seeds. This is performed by "a cost function C" used for determining a seed from among a calculated subset.

Jain is silent regarding the use of a cost function relating to the selection of a candidate used to calculate a subset or used to update a candidate within a calculated subset. Instead, Jain proposes that the centroid is calculated for the entire date, and selecting a first seed that is not updated. Page 97 of Jain indicates that updating a partition is necessary. In contrast, the present claimed arrangement selects seeds in order to obtain a reliable partition, and consequently, allocates key frames as a function of error calculations Furthermore, Jain calculates multiple initial partitions and checks them to ensure that they lead to the same final partition. This is unlike the present claimed arrangement which provides "determination of a seed (k2) from among the key images of the subset such that it minimizes the cost function C

for this subset." This results in increased reliability, by selecting candidates at a minimum cost and updating the selected candidate among all key images of the subset. Thus, Jain, like Bradley and Green, neither teaches nor suggests "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement.

The combination of Bradley, Green, and Jain, similar to the individual systems, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement. A combination of Bradley, Green and Jain would result in a system that selects seeds by selecting successive seed points which are at least a certain distance away from already chosen seed points, and repeats iterations for the selection of a new cluster center, without updates to the cluster center for calculation of the seed. The present claimed arrangement instead allows for the selection of a candidate from among several candidates, by using a cost function to select a first subset. An update of the selected candidate using the cost function is used to further facilitate optimal partitioning of video frames. Specifically, "determination of a subset from among the set of key images" facilitates "determination of a seed from among the key images ... such that it minimizes the cost function C for this subset." Thus, the combination of Bradley, Green and Jain, similar to the individual systems, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement. Therefore, it is respectfully submitted that the rejection to claim 1 is satisfied and should be withdrawn.

Rejection of Claim 3 under 35 U.S.C. 103(a)

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bradley, Green and Jain (hereinafter "BGJ") in view of Palmer ("Density Biased Sampling: An Improved

Method for Data Mining and Clustering," Proceedings of ACM SIGMOD International Conference on Management of Data, 2000), hereafter referenced as BGJ and Palmer.

Claim 3 is dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1.

Palmer describes density biased sampling in order to probabilistically under-sample dense regions and over-sample light regions of data for data mining. A memory efficient algorithm is proposed that approximates density biased sampling using only a single scan of the data. (See Abstract)

Palmer, taken alone or in combination with BGJ, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement. Palmer only describes approximation of a density biased sampling by using a single scan of data. Palmer is silent regarding determination of a subset from a set of key images and determining a seed to minimize a cost function of the subset.

A combination of BGJ and Palmer would result in a system that selects seeds by selecting successive seed points which are at least a certain distance away from already chosen seed points, and repeats iterations for the selection of a new cluster center, without updates to the cluster center for calculation of the seed. Additionally, this process would be preformed with a single scan of the data. However, the present claimed arrangement allows for the selection of a candidate from among several candidates, by using a cost function to calculate a first subset. This is neither taught nor suggested by the combination. An update of the selected candidate using the cost function is used to further facilitate optimal partitioning of video frames. Specifically, "determination of a subset from among the set of key images" facilitates "determination of a seed from among the key images ... such that it minimizes the cost function C for this subset." In addition, performing the process with a

single scan of data is contradictory to the purpose of the present claimed arrangement, which uses an iterative process in order to "refine the grouping of key images" as recited in claim 1 of the present arrangement. Thus, the combination of BGJ and Palmer, similar to the individual systems, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement.

Claim 3 is dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1. Therefore, it is respectfully submitted that the rejection of claim 3 is satisfied and should be withdrawn.

Rejection of Claim 4 under 35 U.S.C. 103(a)

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over BGJ in view of Foote (US Patent 6,774,917).

Claim 4 is dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1.

Foote describes a system for interactively browsing, querying, and retrieving video by similarity. Interactively selected video regions are used to train statistical models on the fly. Query training segments are individual frames, segments of frames, non-contiguous segments, or collections of images. The system can also be used to retrieve similar images from one or more still images. Similarity measures are based on statistical likelihood of the reduced transform coefficients. The similarity is rapidly calculated, graphically displayed and used as indexes for interactively locating similar video regions. (See col. 2, lines 53-63)

Foote, taken alone or in combination with BGJ, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and

"determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement. Foote is silent regarding the aforementioned features.

A combination of BGJ and Foote would result in a system that selects seeds by selecting successive seed points which are at least a certain distance away from already chosen seed points, and repeats iterations for the selection of a new cluster center, without updates to the cluster center for calculation of the seed. Additionally, the combination would include a feature for using specific cluster points to train statistical models resulting in graphically displayed indexes for similar video regions. However, the present claimed arrangement allows for the selection of a candidate from among several candidates, by using a cost function to calculate a first subset. This is neither taught nor suggested by the combination. An update of the selected candidate using the cost function is used to further facilitate optimal partitioning of video frames. Specifically, "determination of a subset from among the set of key images" facilitates "determination of a seed from among the key images ... such that it minimizes the cost function C for this subset." Thus, the combination of BGJ and Foote, similar to the individual systems, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement.

Claim 4 is dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1. Therefore, it is respectfully submitted that the rejection of claim 4 is satisfied and should be withdrawn.

Rejection of Claim 5 under 35 U.S.C. 103(a)

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over BGJ in view of Wan et al. ("A multiresolution color clustering approach to image indexing and retrieval," Proceedings of 1998 IEEE International Conference, pages 3705-3708).

Claim 5 is dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1.

Wan describes a multiresolution color feature extraction scheme based on octree data structure to achieve efficient and robust image retrieval. With the proposed method, multiple color features, including the dominant color, the number of distinctive colors and the color histogram, can be naturally integrated into one framework. A selective filtering strategy is also described. (See Abstract)

Wan, taken alone or in combination with BGJ, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement. Wan is silent regarding the aforementioned features. In addition, Wan only describes selective filtering of colors and not the determination of subsets and a seed among the subset to minimize a cost function.

A combination of BGJ and Wan would result in a system that selects seeds by selecting successive seed points which are at least a certain distance away from already chosen seed points, and repeats iterations for the selection of a new cluster center, without updates to the cluster center for calculation of the seed. In addition, the combination is able to selectively filter certain colors and retrieve features based on color extraction. However, this is unlike the present claimed arrangement because the present claimed arrangement allows for the selection of a candidate from among several candidates, by using a cost function to calculate a first subset. This is neither taught nor suggested by the combination. In the present claimed arrangement, an update of the selected candidate using the cost function is used to further facilitate optimal partitioning of video frames. Specifically, "determination of a subset from among the set of key images" facilitates "determination of a seed from among the key images ... such that it minimizes the cost function C for this subset." Thus, the combination of BGJ and Wan, similar to the individual systems, neither

teaches nor suggests "determination of a subset (lk) from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed (k2) from among the key images of the subset (lk) such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement.

Claim 5 is dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1. Therefore, it is respectfully submitted that the rejection of claim 5 is satisfied and should be withdrawn.

Rejection of Claims 6-8 and 10 under 35 U.S.C. 103(a)

Claims 6-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over BGJ in view of Vailaya et al. ("Video Clustering," Technical Report MSUCPS: TR96-64, Michigan State University, 1996).

Claims 6-8 and 10 are dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1.

Vailaya describes clustering of video images. The issue of efficient and meaningful clustering of keyframes representing shots in the video is addressed. Experiments conducted with human subjects to identify what categories are used to group images is discussed. It is shown that hierarchical clustering schemes based on ad hoc features cannot identify the semantic categories identified by human subjects. (See Section 3, Proposed Scheme)

The Office Action concedes that BGJ neither teaches nor suggests the features of claim 6. However, the Office Action asserts that Vailaya describes "the sequence being split into shots, a shot being represented by one or more key images, at least one signature or attribute being calculated for the key images." Applicant respectfully disagrees. Aside from citing a general block diagram describing a "general problem of video clustering (Section 1.3, Problem Definition), Vailaya does not teach or suggest the features of claim 6. Figure 1, cited by the Office Action only describes the steps taken in order to cluster shots. However,

there is no teaching or suggestion of sequences "split into shots, a shot represented by one or more key images" or signature attributes "calculated for the key images." Thus, Vailaya neither teaches nor suggests the sequence being split into shots, a shot being represented by one or more key images, at least one signature or attribute being calculated for the key images" as recited in claim 6 of the present arrangement.

In addition, Vailaya, taken alone or in combination with BGJ, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement. Vailaya is silent regarding the aforementioned features. In addition, Vailaya only generally shows, through experiments that heirarchical clustering schemes using ad hoc features cannot identify certain categories identified by human subjects. However, this is not the aim of the present claimed arrangement.

A combination of BGJ and Vailaya would result in a system that selects seeds by selecting successive seed points which are at least a certain distance away from already chosen seed points, and repeats iterations for the selection of a new cluster center, without updates to the cluster center for calculation of the seed. The combination including Vailaya would also result in a more efficient way of clustering images. However, Vailaya mainly describes experiments conducted to show why clustering of images is beneficial and not how images are clustered more efficiently. In contrast, the present claimed arrangement allows for the selection of a candidate from among several candidates, by using a cost function to calculate a first subset. This is neither taught nor suggested by the combination. An update of the selected candidate using the cost function is used to further facilitate optimal partitioning of video frames. Specifically, "determination of a subset from among the set of key images" facilitates "determination of a seed from among the key images ... such that it minimizes the cost function C for this subset." Thus, the combination of BGJ and Vailaya, similar to the individual systems, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a

distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement.

Claims 6-8 and 10 are dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1. Therefore, it is respectfully submitted that the rejection of claims 6-8 and 10 is satisfied and should be withdrawn.

Rejection of Claim 9 under 35 U.S.C. 103(a)

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over BGJ and Vailaya in view of Turi et al. ("K-means Clustering for Colour Image Segmentation with Detection of K," Proceedings of the LASTED International Conference Signal and Image Processing, Oct. 27-31, 1998, pages 345-349).

Claim 9 is dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1.

Turi describes a clustering-based segmentation technique developed for color images. The number of clusters is automatically detected. Each of the pixels belonging to a particular cluster must be as close to their cluster center as possible. A K-means algorithm is used as a starting point. (See page 345)

Turi, taken alone or in combination with BGJ and Vailaya, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement. However, Turi is silent regarding the aforementioned features. Turi describes the use of a K-means algorithm to implement cluster based segmentation for color images. However, Turi does not describe the use of a cost function or determining a subset of a set of key images.

A combination of BGJ, Vailaya, and Turi would result in a system that selects seeds by selecting successive seed points which are at least a certain distance away from already chosen seed points, and repeats iterations for the selection of a new cluster center, without updates to the cluster center for calculation of the seed. A combination with Turi adds the use of cluster based segmentation for color images. However, the combination is still not the same as the present claimed arrangement allows for the selection of a candidate from among several candidates, by using a cost function to calculate a first upset. An update of the selected candidate using the cost function is used to further facilitate optimal partitioning of video frames. Specifically, "determination of a subset from among the set of key images" facilitates "determination of a seed from among the key images ... such that it minimizes the cost function C for this subset." Thus, the combination of BGJ, Vailaya and Turi, similar to the individual systems, neither teaches nor suggests "determination of a subset from among the set of key images such that the key images forming the subset have a distance from the candidate less than a threshold T" and "determination of a seed from among the key images of the subset such that it minimizes the cost function C for this subset" as recited in claim 1 of the present arrangement.

Claim 9 is dependent on claim 1 and is considered patentable for the reasons set forth above regarding claim 1. Therefore, it is respectfully submitted that the rejection of claim 9 is satisfied and should be withdrawn.

Having fully addressed the Examiner's rejections, it is believed that, in view of the preceding amendments and remarks, this application stands in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicant's attorney so that a mutually convenient date and time for a telephonic interview may be scheduled.

The required fee of four hundred and ninety dollars ($490.00) for extending the time for a response within the second month after the original response date, pursuant to 37 CFR

1.17(a)(2) should be charged to Deposit Account 07-0832 as stated above. Should any other fee be due, please charge it to Deposit Account 07-0832.

Respectfully submitted,
Ewa Kijak

By: _____
Jack Schwartz
Reg. No. 34,721
Tel. No. (212) 971-0416

Thomson Licensing, LLC
Patent Operations
PO Box 5312
Princeton, NJ 08543-5312
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